

CWD Update 86

May 3, 2007

State and Provincial Updates

Kansas:

Lloyd Fox, Kansas Department of Wildlife & Parks provides the following: Kansas Dept. Wildlife and Parks has collected 10,737 samples for CWD testing since 1996. The only known positive cases of CWD in Kansas occurred in November 2001 at a captive elk facility and in December 2005 from an adult female white-tailed deer killed by a hunter in Cheyenne County. Usable tissues were obtained from 2,970 animals during 2006 and the recent hunting seasons. CWD prions were not detected from any of those samples. The species breakdown for the sample was 2,724 white-tailed deer, 225 mule deer, 15 elk, and 6 animals where the species was not recorded. The majority of the specimens were obtained from animals killed by hunters (n = 2,342 plus n = 400 on animals killed by hunters and taken to taxidermists). Animals killed by vehicles accounted for 185 specimens, while 28 specimens were collected from animals considered CWD suspects. Other source types, such as animals confiscated for law enforcement purposes, accounted for the remaining 15 specimens. For more information on CWD in Kansas, phone Ruby Mosher at 620-342-0658 or email her at rubym@wp.state.ks.us. Kansas Department of Wildlife & Parks press release is available at: http://kdwp.state.ks.us/news/kdwp_info/news/weekly_news/4_26_07/chronic_wasting_disease_not_found_in_2006_deer_season.

New York:

John Major, New York Department of Environmental Conservation (DEC), provides the following: In New York State, efforts continued with CWD surveillance through sampling of hunter killed deer statewide and mandatory check of hunter killed deer and collection of vehicle killed deer in the Oneida-Madison County CWD Containment Area. Despite testing over 7,900 deer, including 1,800 deer from the CWD Containment Area from April 1, 2006 through March 31, 2007, no new cases were detected. CWD surveillance began in New York in 2002, with increased efforts in 2005 after the disease was detected in 5 captive and 2 wild deer in Oneida County. Since 2002, over 18,700 samples have been collected throughout the state, including 3,900 samples from the Oneida-Madison County CWD Containment Area, with no additional positives found. The involved captive facilities were depopulated within weeks of the initial discovery. Regulations prohibiting the feeding of wild deer and restricting the import and movement of live animals and carcasses remain in effect. Surveillance will continue at the same level of effort in the coming year. The NY DEC maintains CWD information at: <http://www.dec.state.ny.us/website/dfwmr/wildlife/deer/cwd.html>.

North Dakota:

The following press release was issued by the North Dakota Game & Fish Department of April 16, 2007: CWD Test Results All Negative. North Dakota deer and elk populations remain free of chronic wasting disease, according to test results recently received by the state Game and Fish Department. Last fall, North Dakota hunters submitted samples for testing from 2,993 wild deer, 37 elk and four moose collected during the 2006 hunting season. All those samples tested negative, said Erika Butler, Game and Fish Department wildlife veterinarian. Samples for CWD

testing were sent to the Wyoming State Veterinary Lab last December. "We are always hopeful that this will be the outcome," Butler said. "We will continue to be aggressive. In addition to testing any suspect animals throughout the year, we plan to continue our hunter-harvest surveillance in the fall." Samples in 2006 were collected from hunter-harvested deer taken from all deer hunting units in the state. "Our volunteer cooperation is overwhelming," Butler said. "We couldn't achieve our goals without their help. Hunters, meat processors, taxidermists, and the assistance from other agencies are vital in this process." Since 2002, nearly 8,500 North Dakota deer and 147 elk have tested negative for CWD. To date, CWD has not been diagnosed in wild or farmed deer or elk in North Dakota. Chronic wasting disease affects the nervous system of members of the deer family and is always fatal. Scientists have found no evidence that CWD can be transmitted naturally to humans or livestock. Press release is at:

<http://gf.nd.gov/multimedia/news/2007/04/070406.html>. North Dakota Game & Fish Department maintains CWD information at: <http://www.gf.nd.gov/hunting/cwd-q-and-a.html>.

Utah:

Leslie McFarlane, Utah Division of Wildlife Resources, provides the following: The Utah Veterinary Diagnostic Laboratory in Logan has completed testing 1,934 mule deer samples collected during the 2006 hunting season by the Utah Division of Wildlife Resources. The positive samples include one deer taken during last fall's archery season, two harvested during the muzzleloader season, and the remaining four were collected during the rifle hunt. The animals were all harvested in areas where CWD has previously been detected, with 6 from the La Sal Mountains and 1 from Vernal. No positive animals were detected from the central portion of the state. In addition to the deer that were tested, nearly 500 samples from elk were collected and none of these tested positive for the disease. To date, CWD has not been detected in elk from Utah. Since the fall of 2002, nearly 12,000 deer samples have been collected in Utah and tested for CWD. Distribution of CWD in Utah occurs in three distinct geographical areas including central and northeastern Utah, where it is estimated that less than 1 percent of the buck population is affected by CWD. In the LaSal Mountains of southeastern Utah, prevalence rates are estimated to be near 2%. To date, 33 samples collected from mule deer have tested positive for CWD. Twenty-four of the 33 positive samples came from the LaSal Mountains, five from the Vernal area, one near the south end of Flaming Gorge, one near Fountain Green, and two 20 miles north of Fountain Green. The Utah Division of Wildlife Resources maintains CWD information at: <http://wildlife.utah.gov/diseases/cwd>.

Recent Publications

Levels of Abnormal Prion Protein in Deer and Elk with Chronic Wasting Disease.

Brent L. Race, Kimberly D. Meade-White, Anne Ward, Jean Jewell, Michael W. Miller, Elizabeth S. Williams, Bruce Chesebro, and Richard E. Race
Emerg Infect Dis. 2007 Jun; [Epub ahead of print].

Abstract: Chronic wasting disease (CWD) of deer and elk is a widespread health concern because its potential for cross-species transmission is undetermined. CWD prevalence in wild elk is much lower than its prevalence in wild deer, and whether CWD-infected deer and elk differ in ability to infect other species is unknown. Because lymphoid tissues are important in the pathogenesis of some transmissible spongiform encephalopathies such as sheep scrapie, we

investigated whether CWD-affected elk and deer differ in distribution or quantity of disease-associated prion protein (PrP^{res}) in lymphoid tissues. Immunoblot quantification of PrP^{res} from tonsil and retropharyngeal lymph nodes showed much higher levels of PrP^{res} in deer than in elk. This difference correlated with the natural prevalence of CWD in these species and suggested that CWD-infected deer may be more likely than elk to transmit the disease to other cervids and have a greater potential to transmit CWD to noncervids.

http://www.cdc.gov/eid/content/13/6/pdfs/07-0186.pdf?s_cid=eid07_0186_x.

A Meta-BACI Approach for Evaluating Management Intervention on Chronic Wasting Disease in Mule Deer.

Mary M. Conner, Michael W. Miller, Michael R. Ebinger, and Kenneth P. Burnham

Ecological Applications: Vol. 17, No. 1, pp. 140–153.

Abstract: Advances in acquiring and analyzing the spatial attributes of data have greatly enhanced the potential utility of wildlife disease surveillance data for addressing problems of ecological or economic importance. We present an approach for using wildlife disease surveillance data to identify areas for (or of) intervention, to spatially delineate paired treatment and control areas, and then to analyze these nonrandomly selected sites in a meta-analysis framework via before–after–control–impact (BACI) estimates of effect size. We apply these methods to evaluate the effectiveness of attempts to reduce chronic wasting disease (CWD) prevalence through intensive localized culling of mule deer (*Odocoileus hemionus*) in north-central Colorado, USA. Areas where surveillance data revealed high prevalence or case clusters were targeted by state wildlife management agency personnel for focal scale (on average <17 km²) culling, primarily via agency sharpshooters. Each area of sustained culling that we could also identify as unique by cluster analysis was considered a potential treatment area. Treatment areas, along with spatially paired control areas that we constructed post hoc in a case-control design (collectively called “management evaluation sites”), were then delineated using home range estimators. Using meta-BACI analysis of CWD prevalence data for all management evaluation sites, the mean effect size (change of prevalence on treatment areas minus change in prevalence on their paired control areas) was 0.03 (SE = 0.03); mean effect size on treatment areas was not greater than on paired control areas. Excluding cull samples from prevalence estimates or allowing for an equal or greater two-year lag in system responses to management did not change this outcome. We concluded that management benefits were not evident, although whether this represented true ineffectiveness or was a result of lack of data or insufficient duration of treatment could not be discerned. Based on our observations, we offer recommendations for designing a management experiment with 80% power to detect a 0.10 drop in prevalence over a 6–12-year period.

<http://www.esajournals.org/esaonline/?request=get-abstract&issn=1051-0761&volume=017&issue=01&page=0140>.

The Nasal Cavity Is a Route for Prion Infection in Hamsters.

Anthony E. Kincaid and Jason C. Bartz

Journal of Virology, May 2007, p. 4482–4491, Vol. 81, No. 9.

Abstract: Animals that naturally acquire the prion diseases have a well-developed olfactory sense that they utilize for a variety of basic behaviors. To assess the potential for the nasal cavity

to serve as a point of entry for prion diseases, a small amount of prion-infected brain homogenate was placed inferior to the nostrils of hamsters, where it was immediately sniffed into the nasal cavity. Hamsters extranasally inoculated with the HY strain of transmissible mink encephalopathy (TME) agent had an incubation period that was not significantly different from per os inoculation of the same dose of the HY TME agent. However, the efficiency of the nasal route of inoculation was determined to be 10 to 100 times greater based on endpoint dilution analysis. Immunohistochemistry on tissues from hamsters killed at 2-week intervals after inoculation was used to identify the disease-associated form of the prion protein (PrP^d) to determine the route of prion neuroinvasion. Nasal mucosa-associated lymphoid tissue and submandibular lymph nodes initially accumulated PrP^d as early as 4 weeks postinfection. PrP^d was first identified in cervical lymph nodes at 8 weeks, in the mesenteric lymph nodes, spleen, and Peyer's patches at 14 weeks, and in the tongue 20 weeks after inoculation. Surprisingly, there was no evidence of PrP^d in olfactory epithelium or olfactory nerve fascicles at any time after inoculation. Therefore, the HY TME agent did not enter the central nervous system via the olfactory nerve; instead, PrP^d accumulated in elements of the cranial lymphoreticular system prior to neuroinvasion.

<http://jvi.asm.org/cgi/content/abstract/81/9/4482>.

The Spread of Prions through the Body in Naturally Acquired Transmissible Spongiform Encephalopathies.

Michael Beekes and Patricia A. McBride

FEBS Journal 274 (2007) 588-605.

Abstract: Transmissible spongiform encephalopathies are fatal neurodegenerative diseases that are caused by unconventional pathogens and affect the central nervous system of animals and humans. Several different forms of these diseases result from natural infection (i.e. exposure to transmissible spongiform encephalopathy agents or prions, present in the natural environment of the respective host). This holds true also for scrapie in sheep, bovine spongiform encephalopathy in cattle, chronic wasting disease in elk and deer, or variant Creutzfeldt–Jakob disease in humans, all of which are assumed to originate predominantly from peroral prion infection. This article intends to provide an overview of the current state of knowledge on the spread of scrapie, chronic wasting disease, bovine spongiform encephalopathy and variant Creutzfeldt–Jakob disease agents through the body in naturally affected hosts, and in model animals experimentally challenged via the alimentary tract. Special attention is given to the tissue components and spreading pathways involved in the key stages of prion routing through the body, such as intestinal uptake, neuroinvasion of nerves and the central nervous system, and centrifugal spread from the brain and spinal cord to peripheral sites (e.g. sensory ganglia or muscles). The elucidation of the pathways and mechanisms by which prions invade a host and spread through the organism can contribute to efficient infection control strategies and the improvement of transmissible spongiform encephalopathy diagnostics. It may also help to identify prophylactic or therapeutic approaches that would impede naturally acquired transmissible spongiform encephalopathy infections.

<http://content.febsjournal.org/cgi/content/abstract/274/3/588>.

Miscellaneous

USDA FY08 Budget Request for Chronic Wasting Disease

The United States Department of Agriculture's 2008 budget summary is posted at: <http://www.obpa.usda.gov/budsum/fy08budsum.pdf>. Page 76 of this document (Pest and Disease Management Programs) identifies that "Decreased funding is also proposed for brucellosis, chronic wasting disease, pseudorabies, and other efforts." The line item for CWD in the FY08 President's Budget Request for USDA is \$12.3M, down \$6.2M from the FY07 budget estimate of \$18.5M. USDA utilizes this funding to provide fiscal support to the states for CWD surveillance activities (both captive and free-ranging). The President's Budget Request is the initial portion of the federal appropriations process. Congress ultimately determines the level of funding that will be made available to USDA for CWD and other programs.